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MEXICAN MIGRATIONS. — At the Exposition Internationale de Géographie held at Paris last year, Professor Quatrefages exhibited an unpublished map illustrating the migrations of the Mexicans.

MICROSCOPY.¹

AMATEUR MICROSCOPES. — The notorious success of Mr. Wenham, the late Mr. John Williams, and some other microscopists, in preparing their own apparatus, is exceptional only by reason of the degree of excellence attained. It is especially true of microscopists that they love the instruments they work with, and from this love follows not only the partially unfortunate "test-object fever," but also the eminently useful habit of studying, adapting, altering, and finally manufacturing accessories, if not instruments, suited to their needs and fancies. Such amateur work not only is the best possible drill in the science of the microscope, but also has added very largely to the development of the microscope of to-day. The European journals are full of interesting and profitable results from such work; while the readers of the *NATURALIST* have long been familiar with the contrivances and original constructions of a considerable number of American workers. Most microscopists, however, have confined their attempts to the production of accessories, believing, very judiciously, that the microscope as a whole could be more successfully made by more experienced hands. Of the comparatively few home-made microscopes, two recently published forms may serve as examples of the two extremes of ultra simplicity on the one hand and the best attained success on the other. In the form contrived by Mr. John Phin and described in his *Practical Hints*, the body consists of a tube of stiff writing-paper rolled several times around itself, pasted at the outer edge, and blackened on the inside. This tube slides, for focal adjustment, through another paper tube. A piece of looking-glass serves as mirror, and a demolished cigar box furnishes wood enough to make the remainder of the stand. A simple half-inch lens acts as objective, and a similar lens of two-inch focus constitutes the ocular or eyepiece. The lenses are held in place in the tube by means of the bottoms of pill boxes perforated to allow the passage of light, while similarly perforated pill boxes are placed in the tube in proper position to act as diaphragms to reduce aberration by cutting off stray light. Such a microscope, at a cost of fifty cents, is conceded to be too imperfect to use for scientific study or even for instructive amusement, its utility being not in the using but in the making of it. It is believed that a student by actually constructing such an instrument would gain a very clear idea of the essential parts of the microscope, as well as a good understanding of the faults of simple work and uncorrected lenses.

The more elaborate instrument referred to is described by Mr. John

¹ This department is conducted by DR. R. H. WARD, Troy, N. Y.

Michels in the last November number of the *Popular Science Monthly*. The essential parts of a microscope-stand are simplified and combined with great ingenuity and judgment. The form of stand is essentially that of the pocket microscopes of Swift and some other London makers, in which a single inclined bar, resting on the table at its lower end and supported by two legs near its upper end, carries firmly and conveniently the mirror, stage, and compound body. The blackened paper tube which serves as body is large enough to receive a good ocular or eyepiece at the top, and contains at the bottom a society-screw adapted to hold any objectives that may be chosen. It slides through a wooden tube lined with cloth, giving a good coarse adjustment. This wooden tube is glued, by means of an intervening piece of wood, to the main inclined bar of the stand. The stage is of wood, or gutta-percha modeled into shape while warm, also attached by means of a block of wood, and the object slide is held in position by elastic india-rubber bands. The mirror and its immediate mounting is that of a common student's stand. This instrument stands nearly fifteen inches high when in use, weighs one pound, and can be packed within a space fourteen by three and a half by three inches. It is perhaps the best amateur microscope that can be made at the present time by a student of average mechanical skill. One reason why it is the best is because it contemplates the use for all its optical parts of first-class professional work; for we cannot quite agree with its author that there is no reason why the student should not make his own lenses. Objectives have reached a degree of excellence which has quite outgrown the skill of an ordinary amateur. True, Mr. Wenham can make lenses of surpassing excellence, and so could Mr. Spencer, while still unlearned in the science and unpracticed in the art of microscopy, but such instances are so rare as not to compromise the accuracy of the statement that amateurs cannot make as good lenses as they can buy. Nor do we think that the author does full justice to the recent progress achieved (though still too little) by the regular makers in the way of furnishing good and useful work at an available price. What is called first-class apparatus is still prohibitively costly, and much of the cheap work is more than correspondingly poor; yet instruments can now be bought at a reasonable cost that would not be fairly described as characterized by "diminutive size, smallness of field, poor light, shortness of tube, absence of society's screw, and other evils" which "will soon cause" them "to be cast aside." Nor do we share the author's difficulty in finding lenses in this country which he can specially recommend. Most of our distinguished makers now prepare not only lenses of excessively high angle and price, but also lenses of exquisite workmanship, moderate angle, simple mounting, and available price; lenses which we recommend with double pleasure because of our strong faith in the utility of moderate angles for general use, and our firm belief that the perhaps neces-

sarily high cost of the high-angle lenses has materially retarded the growing popularity and usefulness of the microscope itself.

A REMARKABLE FORAGE FOR BEES. — Rev. J. L. Zabriskie, whose interesting papers on bee-bread, in the *Bee Keepers' Magazine*, have given readers unfamiliar with the sciences concerned a reliable understanding of the structure of pollen, and the curious development, upon the hind legs of the bees, of the pollen brushes and pollen baskets with which the pollen is gathered, loaded up, and carried to the hives, observed, during the last summer, bees coming to his hives loaded with an unusually large quantity of a pollen-like powder having a bright vermilion color, not before noticed. The pollen baskets were filled to overflowing with this novel food, which the bees were carrying to their hives and storing away in the usual manner. Microscopically examined the grains were unlike any known pollen, but corresponded exactly in their peculiar color, size, shape, granular contents, and character and delicate markings of the epispore, with the raspberry rust, which was abundant at the time on leaves in the garden and adjoining fields; this rust being a leaf fungus (*Uredo luminata*) whose delicate mycelial cells force themselves among and draw nourishment from the cells which form the tissue of the leaf, and which at the time of fruiting rupture the skin in little spots on the under surface of the leaf, and develop crowded clusters of bright red spores surrounded by the upturned edge of the ruptured leaf skin, which looks, when magnified, not unlike a little dish filled with miniature strawberries. The bees were not seen to gather spores from these clusters, but the grains carried to the hives were positively identified by comparison with fresh specimens from the leaves. This presumably unwholesome food seemed to have no unfavorable effect on the health of the infant families of bees. Whether some such strange choice of food is related to the occasional occurrence of poisonous honey, may be suggested.

CRYPTOGAMIC PARASITES. — The report of M. Maxime Cornu, in the *Bulletin Entomologique*, on a larva of *Chelonia Hebe* which had been killed by a parasitic fungus, refers the fungus to the genus *Entomophthora*, and possibly to the species which preys upon flies in the autumn. The presence of this parasite in a larva he thinks has not been previously recorded. M. Cornu concludes that fungi cannot perforate healthy animal tissues, but must enter through some wound or other opening, since he has observed an *Aphis* of the elder infested even to the antennæ with an abundance of corpuscles of a species of *Entomophthora*, while the fifty-two young in different stages of development contained within the affected insect were all perfectly free and healthy.

BLOOD GLOBULES IN TYPHOID FEVER. — M. Cornil has found, in the blood of the spleen of patients who have died in the third week of typhoid fever, large numbers of white globules, inclosing red globules to the number of five, six, or even more in a single cell. Other cells in-

closed granules of hæmotosine. Although the existence in the blood of these large cells containing red globules is nothing new, nevertheless Cornil is the first to insist upon their multiplication in typhoid fever. The mesenteric glands, according to Cornil, are always inflamed in typhoid fever, in a manner analogous to the acute or subacute inflammation due to suppurative lymphangitis. — *The Medical Record, from Lyon Médicale.*

JAMES W. QUEEN & Co. — This well-known firm has been once more dissolved, Mr. Cheyney carrying the department of philosophical apparatus with him to Bond Street, New York city. The remaining partners, S. L. Fox and W. H. Walmsley, retain the microscopical branch of the business at the old stand and under the old name. Microscopists will find G. S. Woolman in charge of their department at the New York store.

RAPHIDES IN ENCHANTER'S NIGHTSHADE. — The *Bulletin of the Torrey Botanical Club* suggests sections of the enchanter's nightshade (*Circea Lutetiana* L.) as an interesting microscopical study, the leaves, stem, and root being crowded with raphides, and the cells of the pith being filled with small transparent ball-like bodies.

A POLARISCOPE OBJECT. — Hairs of common gromwell (*Lithospermum officinale* L.) are said to polarize beautifully under the microscope.

SCIENTIFIC NEWS.

— The following remarks by the editor of *Nature*, though referring to science in England, are not perhaps out of place in an American journal: —

“By looking to general science, again, the government avoids the difficulties which must necessarily accompany, with all the fluctuations of trade, any attempt to teach applied science except in some very general forms. The fact is that the practical applications of science bring their own reward, and need no extraneous encouragement; instruction and invention in them may very well, and without the least hardship, be left to those whose pockets they fill. Art receives ample encouragement, and is well rewarded by the nation; let but an artist in any department show himself capable of producing good work, and he will soon find that both the government and private individuals have plenty of rewards to bestow upon him. Science, on the other hand, receives not a penny in the way of assistance or reward, and yet the scientific investigator is the nation's servant and greatest benefactor. Pure scientific research is at present, like virtue, its own reward; the man who devotes himself to such research, unless he has some other means of gaining a livelihood, is likely enough to starve, for all the help he will get from his country; and yet, as it has been shown over and over again, our country's pros-